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U. S. DEPARTMENT OF AGRICULTURE,

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NEWS-LETTER

OF

THE

OFFICE OF CEREAL AND FORAGE INSECT INVESTIGATIONS.

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A NEW DEPARTURE IN ECONOMIC ENTOMOLOGY.

This past season the U. S. Bureau of Entomology undertook an entirely new method of entomological work, a work as unique as it was economic and as economic as has been the usual line of work in the past.

For some years past a caterpillar of the moth, Hemileuca oliviae, has been devastating certain portions of the cattle and sheep ranges of northeastern New Mexico, feeding upon the gramma grasses of this region. Finally the pest began assuming such proportions and the territory covered increased so rapidly that an urgent appeal was made for an investigation. In 1909 and 1910 Mr. C. N. Ainslie made a preliminary survey and study of the species, the results of which were published in Bulletin No. 85, Part V, of the Bureau of Entomology. Following this study it was at once appreciated by the stockmen of the territory that unless natural barriers checked the spread, something definite must be done in order to keep the pest from overrunning the grazing areas of not only New Mexico but adjoining States. Accordingly, through the efforts of stockmen, Senators, and Representatives of the States interested, the last Congress appropriated a special sum of money for a thorough investigation of the insect, including methods of control and means of preventing the spread of the depredator.

In undertaking this investigation, a number of problems presented themselves to the ones who were planning the carrying out of the work. One of these was the fact that as the infested area is a grazing area the country is sparsely settled and the towns are few, far between, and of small population, thus making it difficult and practically impossible to secure proper lodging and board for a force of men. This, together with the fact that many of these towns have small irrigated areas surrounding them and thus no infestation of Hemileuca near by, necessitated the organizing of a field party. This was finally accomplished, and in May (1913) tents were pitched and the camp formally opened, it being located on a 100,000-acre ranch belonging to the Springer Bros, about 18 miles from Raton, N. Mex., and five miles from Koehler, a small mining town on the Cow Creek Ranch. The camp had only prarie dogs, coyotes, and rattlesnakes for neighbors, and the nearest shade tree was miles away.

At the beginning six men besides the writer and the Japanese cook were assigned to the camp. Later in the summer two more men were added to the force, so that as many as ten were included in the party. Five tents were used. One of these, 16x20 feet, was used as a cook tent. Three, 14x16 feet, were used as sleeping and laboratory tents and one of the same size for a supply tent, for equipment, etc. Owing to the fact that we were located in a southern latitude the heat of midday was often extreme while the high altitude, some 6,500 feet, caused cool and often cold nights. This midday warmth accompanied by many heavy showers necessitated the equipment of our tents with tent flies, and the cool nights necessitated an abundant supply of bedding for our cots. The party was thus well protected against the elements.

Table supplies were secured at Raton and transported from the nearest railroad station by wagon, except for a period in June, when heavy rains washed out railroad tracks and telephone lines (this in a dry country). thus cutting us entirely off from the outer world - or would you say "inner world"? We were always well supplied with food and other necessities. A near-by "watering hole" with its friendly well and windmill supplied us, as well as our friends, the cattle, with abundant drinking water.

For locomotion we many times used our own motive power but for convenience and for longer trips were supplied with two cow ponies and two Indian motorcycles, the latter with tandem attachment for carrying double. We were thus able to cover a considerable area and, being located not only in the midst of the outbreak but probably near where it had its origin, we were able to "live with our work," literally as well as figuratively.

For an insectary we tried several arrangements. We had to have shade. First muslin was used, but because of the heavy winds which spring up nearly every afternoon from the snow-capped mountains to the west and southwest of us, this was shown to be impracticable. A tent could not be used because of the already mentioned midday rise in temperature. So finally a tent fly was secured, only instead of being over a tent it was itself resting upon a ridge pole and with the lower edges tied high up on the supporting guy posts so that there was abundant circulation of air from all sides. This was found to be a very satisfactory arrangement and was of course a protection from the rain as well as from the sun. Convenient shelves were then constructed and placed beneath this, thus making room for our small cages, trays, etc. This kind of protection proved to be so well adapted to the work that it seems that it could be used to advantage in other sections or at other laboratories where only a temporary shade is wanted.

Our work was divided along five lines: First, the life history and habits of the range caterpillar. This had already been admirably carried through one season and parts of others by Mr. C. N. Ainslie but was now considered from a broader viewpoint and over a larger section of the country, with better equipment for carrying through the work. Second was the scouting work to ascertain the present distribution of the species and the corresponding relation between its distribution and natural barriers. We find a considerable relation here, the mountains to the west apparently checking it entirely, while the extremely dry area in central New Mexico is almost as complete a barrier. The path of dispersion from the present area is open to the eastward.

The third division of our work was the mechanical methods of control. Under this work came such things as brush dragging, rolling, and burning the infested area. Of course it at once occurs to the reader that these methods are almost prohibitive because of the relatively small value of the land per acre and the greatness of area covered and managed by one man. However, it was hoped that some success might be had in this line, as often severe outbreaks occurred in spots or restricted areas especially on the edge of newly infested territory. The results of such work were not very encouraging, however, and more experimenting is needed along this line.

The fourth division, the rearing and study of native parasites and enemies, was really divided into two branches. The rearing of native parasites was conducted by the Bureau of Entomology while other enemies, such as birds and mammals, were studied in cooperation with the U. S. Biological Survey, a man being detailed from that office to oversee the work.

The fifth division of work, that of parasite introduction, is one that gave us considerable hope for a control of the pest, but like others is quite uncertain. As there is no other species of Hemileuca that occurs in numbers sufficient for parasite development we had to look for parasites and predaceous enemies of altogether different families. Several shipments of predaceous beetles and tachinids were received from the Gipsy Moth Laboratory, through the kindness of Mr. Burgess, and while we do not know whether these will survive the northern New Mexico winters it is gratifying to note that several species of Calosoma took hold nicely, while the tachinid, Compsileura concinnata has been successfully carried through on Hemileuca larvae.

The work, having been largely preliminary this past year, will be continued during the season of 1914, and we hope with more desirable weather conditions and a knowledge gained by the past summer's experience, to be able to accomplish much more during the coming summer.

V. L. WILDERMUTH.

I was interested in Mr. Urbahn's formula for diluting alcohol, but I think he has complicated the matter unduly. Since the two 100's he gives cancel, what is their use? Why not make the formula more simple, as,

$$\frac{\text{Present strength}}{\text{Desired strength}} \times \frac{\text{Quantity to be changed}}{1} =$$

Or better and more simple still use the following formula:

Desired strength : Present strength :: Quantity to be changed : X

70 : 95 :: 20 : X

But in any case this is a formula that is hard to remember, and the simplest formula for diluting alcohol which is given in most text books is as follows: "To obtain a given per cent of alcohol through dilution of a higher per cent with distilled water, subtract the per cent required from the per cent of the alcohol to be diluted; the difference is the proportion of water that must be added. Thus, if 35 is the per cent required, and 95 the per cent to be diluted, then 95 - 35 = 60; hence 60 parts of water and 35 parts of 95 per cent alcohol are the proportion for mixing." (Guyer.) This is a very simple formula and one which can be remembered quite easily. I would suggest also for the News Letter the value of the alcoholometer. This is a simple apparatus costing about $1.50 with which the per cent of any alcohol can be obtained. We have had such an instrument and the two cans of alcohol received from the supply department at Washington have tested 95 1/2 and 94 per cent, respectively. Alcohol purchased at drug stores is liable to vary considerably and for this and other reasons an alcoholometer is a handy instrument to have on hand. J. J. DAVIS.

If those who applied for the plates mentioned on p. 3, December News-Letter, have found that Plates 3 and 4 of the Vespidae are missing. These will be supplied them on application to the Chief of Bureau.

Mr. L. P. Rockwood, of the alfalfa weevil investigations, working on introduced parasites, has been doing some work in the office and also in the U. S. National Museum.

The Iowa State College is about to establish a course in entomology that, it is expected, will fit young men for filling positions in Government and State service in applied entomology. Dr. R. E. Buchanan, Acting Dean of the School of Science, writes under date of December 2, 1913, "We realize that we can not step into the front rank in a day, but we intend to make some serious beginnings this year toward developing our work in entomology."

Elaterid larvae are found in the soil, under stones, moss in woodlands, and the bark of rotten logs and stumps, and may be collected in large numbers by following the plow.

If facilities are not at hand for rearing they may be placed in small salve boxes, obtainable at headquarters or from any druggist, filled with moist sphagnum moss, obtainable from any florist; or if this is not at hand, any moss will answer. Only one larva should be placed in a box, as some of the forms are predaceous. The boxes may be packed and mailed to the Hagerstown, Md., laboratory.

For rearing elaterid larvae, place a quarter-inch layer of plaster of Paris in the bottom of a salve box and fill the box with the natural nidus of the larvae (wood pulp, earth, moss, etc.), and feed with as near normal food as possible. We have been successful in rearing all of the forms so far obtained with but two kinds of food, wheat grain and insect larvae. When normal food is unknown give the larvae wheat grain and any soft bodied larvae to determine whether predaceous or plant feeding forms. Lachnosterna larvae are unfitted for this, as they often destroy elaterid larvae by mutilating them.

JAMES A. HYSLOP.

MEMORANDUM NO. 53.

December 4, 1913.

Regarding attendance upon meetings of scientific and related societies.

With a view to clearly defining procedure in the matter of attendance by employees of the Department at meetings of scientific and related societies the following memorandum is submitted.

The Department may from time to time desire to have a limited number of representatives attend such meetings, either to acquire information or to present facts of interest and value to the public. In such cases the Department will officially designate the representatives, and their usual expenses for travel and subsistence will be paid.

It is recognized that the attendance of scientific workers at meetings of their associates is desirable, but it is believed that such attendance should be regarded more for the purpose of instruction and training, of direct personal advantage to the employees. Employees should be encouraged to attend such meetings, and when attendance is recommended by the chief of the Bureau concerned, leave of absence with pay may be granted. All expenses, however, should be borne by the employee. Emphasis should be laid on the necessity for not permitting the work to be injured by over-depletion of the force at any one time.

Each case will need to be treated on its merits and receive the recommendation of the Chief of Bureau and the approval of the Secretary in advance.

(Signed) B. T. GALLOWAY,

Assistant Secretary.

Mr. Jas. A. Hyslop has been doing some work in the National Museum on the Elateridae.

Mr. D. J. Caffrey, who has been searching for Hemileuca in New Mexico, has been assigned to temporary duty at the Tempe, Ariz., station.

Mr. R. N. Wilson has spent some time in the office and will work during the remainder of the winter in the Charlottesville, Va., laboratory.

Mr. Wildermuth, who has been in the office for some weeks engaged on the manuscript for a bulletin on Eurymus eurytheme, has returned to Tempe, Ariz.

Authors publishing entomological articles in non-entomological journals, who desire to have such articles noted in its current literature list, will do well to send copies of them to ENTOMOLOGICAL NEWS, 1900 Race St., Philadelphia, Pa. After note has been made of the same, they will be deposited in the library of the American Entomological Society.

Among the December appointments to this office was Mr. Adolph H. Beyer, University of Kansas, assigned to the Columbia, S. C., station, and Mr. Chas. F. Stiles, Mississippi Agricultural College, assigned to the Greenwood, Miss., station, superseding Mr. E. H. Gibson, transferred to the Tempe, Ariz., station.

In the last News-Letter I notice Mr. Urbahns's formula for the dilution of alcohol. It is near enough for practical purposes but it is not correct. The point is that while weight is indestructible—that 1 pound of a substance added to 1 pound of another always gives 2 pounds, it is not true of volumes. Atomic condensation comes in with liquid and with alloys. Thus 1 cc. alcohol (pure) plus 1 cc. water will not give 2 cc. but a little less. J. T. MONELL.

My laboratory tables are made of white pine, are 2 feet wide and 1 3/4 inches thick when dressed. They should be made a length suitable to the purposes for which they are to be used. They are tongued-and-grooved and put together with glue as it is next to impossible to get a board of that width now. There should be a leg at each four corners for a short table and two in the middle if the table is long. These legs are hard pine and 2 1/2 inches square at top and begin to taper about half way down the leg. At each corner where these legs attach an inch and a half hole is bored, 3/4 in. deep. The leg is then made with a corresponding offset to fit this hole, then two right-angled iron braces are screwed to the legs and the tables, which firmly and securely hold the legs in place. These legs can be made any convenient length. Then a nicely finished two-drawer cabinet (perfectly plain) 13 1/2 in. x 22 in. (inside measurement), made of white pine should be made and placed on top of the table at one end. If it is a long table, make one for each end. This will give sufficent drawer space and it will not be in the way of the knees while working. I put no finish whatever on the table, but this wood will ebonize beautifully if that is preferred. This table has another advantage in that it can be quickly taken apart and shipped (when wrapped) as an ordinary board. I forgot to mention that there should be couple cleats (about 3/4 in. thick) screwed crosswise of the table underneath to prevent any possible warping. This is the most convenient, workable table I have seen for laboratory use, and any shop or good carpenter can easily make it at nominal cost. W. J. PHILLIPS.